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| Created By | Edgar Magana |

CTO – OpenStack Users Guide

This document provides an administration guide for OpenStack Users using Cygnet OpenStack to facilitate user experience.

This is a working document. Do not take anything verbatim until CTO oversight have signed off

Reviewers

|  |  |
| --- | --- |
| * Department | * Name/Title |
| VP CTO | Lew Tucker |
| Development Engineering | [Dan Florea](mailto:nxos-arch-team@cisco.com) |
| Customer Solutions | Daneyon Hansen |
| Development Engineering | Edgar Magana |
| Systems Development Engineering | Mark T. Voelker |

The departments and/or individuals listed above should be notified in advance and given a sufficient time period to review this document. The Project Team determines requirements for approval according to the scope of the project.

Modification History

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| * Revision | * Date | * Originator | * Comments |
| 1 | June 20, 2012 | Edgar Magana | Initial Draft |
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| 3 | June 26, 2012 | Mark T. Voelker and Edgar Magana | Mayor Editing |
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# Introduction

OpenStack is a global collaboration of developers and cloud computing technologists producing the ubiquitous open source cloud computing platform for public and private clouds. The project aims to deliver solutions for all types of clouds by being simple to implement, massively scalable, and feature rich. The technology consists of a series of [interrelated projects](http://openstack.org/projects/) delivering various components for a cloud infrastructure solution.[[1]](#footnote-1)

OpenStack provides a tool to orchestrate a cloud, including running instances, managing networks, storing files, and controlling access to the cloud through users and projects. It provides the software that can control an Infrastructure as a Service (IaaS) cloud computing platform. It is similar in scope to Amazon EC2 Cloud Servers and Amazon S3. Major components include OpenStack Compute (also known as Nova), OpenStack Storage (also known as Swift), OpenStack Image Service (also known as Glance), OpenStack Dashboard (also known as Horizon), and OpenStack Identity Services (also known as Keystone). OpenStack Compute does not include any virtualization software; rather it defines drivers that interact with underlying virtualization mechanisms that run on your host operating system, and exposes functionality over a web-based API.[[2]](#footnote-2)

OpenStack can be used by many different projects (tenants) sharing resources in the same system. Earlier versions of OpenStack used the term "project" instead of "tenant". Because of this legacy terminology, the word projects and tenants are used interchangably this document. The goal of this document is to help cloud administrators familiarize themselves with OpenStack.

This administration guide assumes the successful deployment of OpenStack based on the installation process indicated in the OpenStack Installation Guide [1].

# OpenStack User Interface (UI) - Dashboard

OpenStack offers a user-friendly graphical interface called the OpenStack Dashboard (also known by it’s codename: Horizon). The dashboard offers two different views: the Admin System Panel and the Project Panel. The Admin System Panel is exclusively for cloud administration activities such as creating projects and users or registering images. The Project Panel is used by tenants to control their projects, including functions such as managing compute servers or creating new instances and volumes. In this guide we will focus on the Project Panel.

The OpenStack Dashboard is a web-based interface compatible with Firefox 13 (recommended), IE 7 and Crome 19. To acess the Dahsboard simply open your browser and type the IP address of the Horizon host server, if DNS is enable in your network the host name may be used. Figure 1 illustrates the OpenStack Dashboard Log In screen.

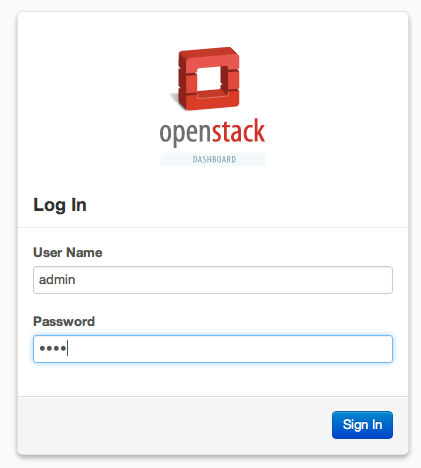


Figure 1. OpenStack Log In UI - Dashboard

# OpenStack Tenant Operations

Physical resources in an OpenStack cloud can be used by many different projects (tenants) simultaneously. Earlier versions of OpenStack used the term "project" instead of "tenant". Because of this legacy terminology, the word projects and tenants are used interchangeably in this document.

OpenStack implements a role-based administration in order to limit access to administrative functions. In the default configuration, there are only two basic roles to consider: the admin and project-users. The operations mentioned in this guide correspond to project users (refer to the OpenStack Administration Guide for more information about admin operations).

In order to perform any user actions, the user must log in using a username and password that are registered to the project in which he intends to operate. For information on how to associate users with projects, consult the OpenStack Administration Guide. For purposes of illustration, we have created a user for the “mycompany” project that is also called “mycompany”.

## Project Overview

Once project users have logged into the OpenStack Dashboard using the username and credentials provided by the OpenStack Administrator, they will be directed to the Overview section where they will find a project-based usage summary of the cloud infrastructure. The summary includes information such as the number of instances running, memory utilization, and disk space. Figure 2 shows the summary for the “mycompany” project (tenant).

The data shown in the Usage Summary for each project can also be exported to a CSV (comma-separated variable) file. To download a CSV version of the Usage Summary, click on the “Download CSV Summary” button on the righthand side of the Overview section.

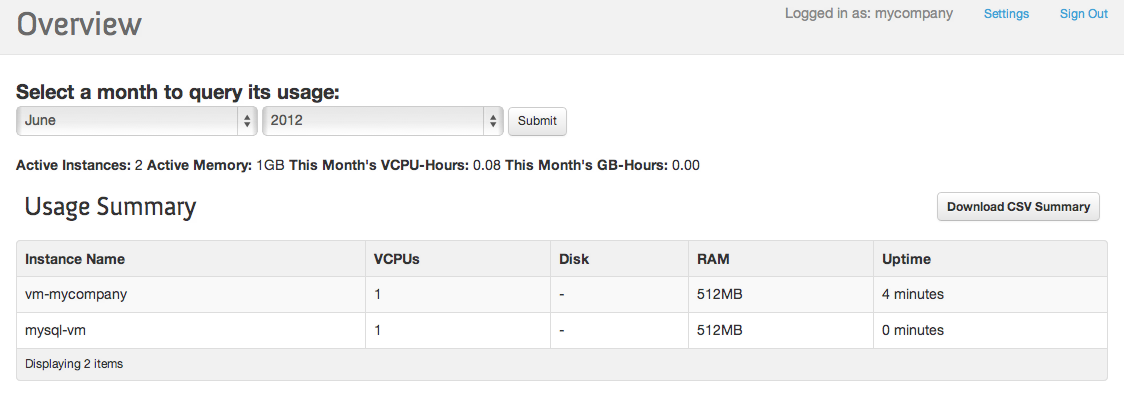


Figure 2. Project-based Overview of Usage Summary

## Access & Security

Now that we’ve seen a summary of a project, let’s consider how users will interact with the project. Programmatic access to the tenant-facing API’s in an OpenStack cloud is controlled by public/private key pairs. Key pairs are created for each user within a project. To create a keypair, click on “Access & Security” in the navigation menu on the left. Scroll to the “keypairs” section of the page and click on the “Create Keypair” button to generate a new key pair. You’ll need to supply a name for each keypair—the name can be whatever you want, but in practice the name often reflects who the keypair belongs to. A file with the key will be automatically downloaded to the computer used to interact with the OpenStack Dashboard.

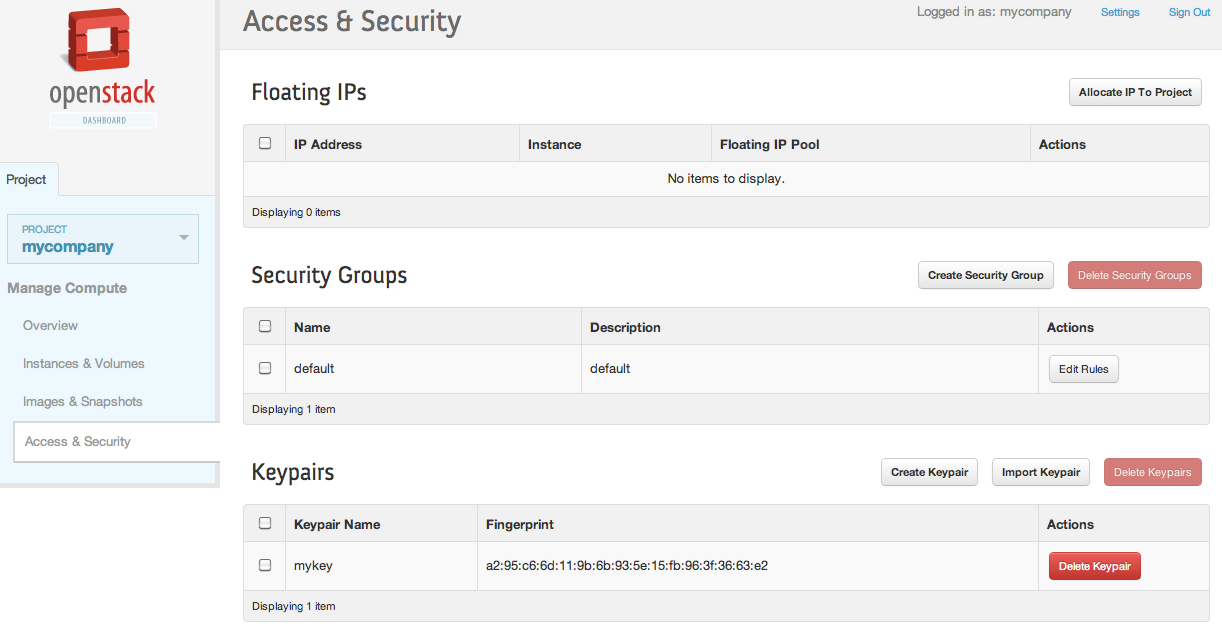


Figure 3. List of Floating IPs, Security Groups and Keypairs Available

The file will have the extension .pem and will look like this:

-----BEGIN RSA PRIVATE KEY-----

MIICXgIBAAKBgQCclbUO4Xs6mEdgQAgUbYoOhRHLwzR1wA/3YKl8PMSBPc1jEGtx

5gSMYyfPTPJlf54OP62PSoGMnYVGA///NvaWSvPMJjtBsSA6Qrs3zWzeCU2GaBDT

bkB3NUkwqq6Z7U56QjzhJ6T9jFb3q3pU8f3ukDAQAUVVMpsKEHgceT8pRQIDAQAB

AoGBAJCQfvrgHf84/BzWwR7rCtzg6k8vR822pocDjTaQe/O+dVMSo8AiVuyt1uFC

7z/aFLie/cQfS3/hJlw/8SdVPU6O3xBpReIlkNVgD06AlhmWoUai+0kMNE3gcX8a

EWn48VPpm7UOUFVfsZ+Xi/5lU0+UjIqyfKQQuIwnu3xn9i6BAkEAy+KftTfnIWLv

1yY8Z6G4Fn4SoRux8rK0bEkau3wAPWalxeufzKW16OcSeI/+rDaXwMc1M+OAmvu9

VuVOCRrZUQJBAMSb8cpEyunUcneLV2neoqqXnWReEUwK40AlxM2Geag1SYtoHeH+

W9qdBqk5VGnwGuQ+ENGzV57AzARjI7hak7UCQQCKt1Sr6i4CJBtESYp9g6UJAJvS

K1Kl6nog1pguiQ5suCL/hvGBPhmHLXf+uRGvv7D+A0sqU5YTXEWVEoxGW5MRAkEA

tGsWWrL+Mc2OrTzlHnX7d+hhunTIEqv7FiaSjrfUdBNSRedpZLVxvQ9TyX6ehAid

5M0/ye91fG0Xyv7fDJGx8QJAWwMmujaNWxfLVpY2+Fzo3vMm2Pc0hU2jWpXHiloB

0thYal6jdVwaT/GtttjlIt9WEt5KsFarqFtqhCNix/1ETA==

-----END RSA PRIVATE KEY-----

OpenStack Dashboard will show the key created with the only available action of deleting it. Figure 4 shows the created keypair named “mykey”.

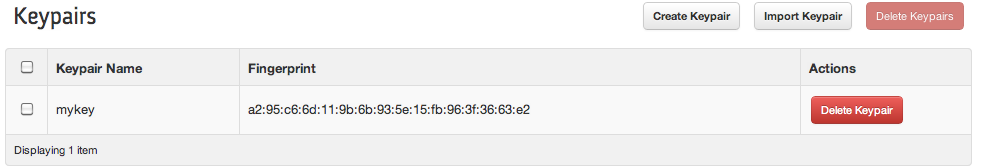


Figure 4. Creating a new keypair

Section 3.4 “Accessing Instances by Terminal Console” covers how to use keypair files to get access to tenant’s instances.

## Instances

An instance is a running virtual machine within the cloud. An instance has a life cycle that is controlled by OpenStack Compute. Compute creates the instances and it is responsible for building a disk image, launching it, reporting the state, attaching persistent storage, and terminating it.[[3]](#footnote-3)

We are ready to start new instances. On the Project Panel select “Instances & Volumes” and then simply click over the “Launch Instance” bottom at the top of this screen.

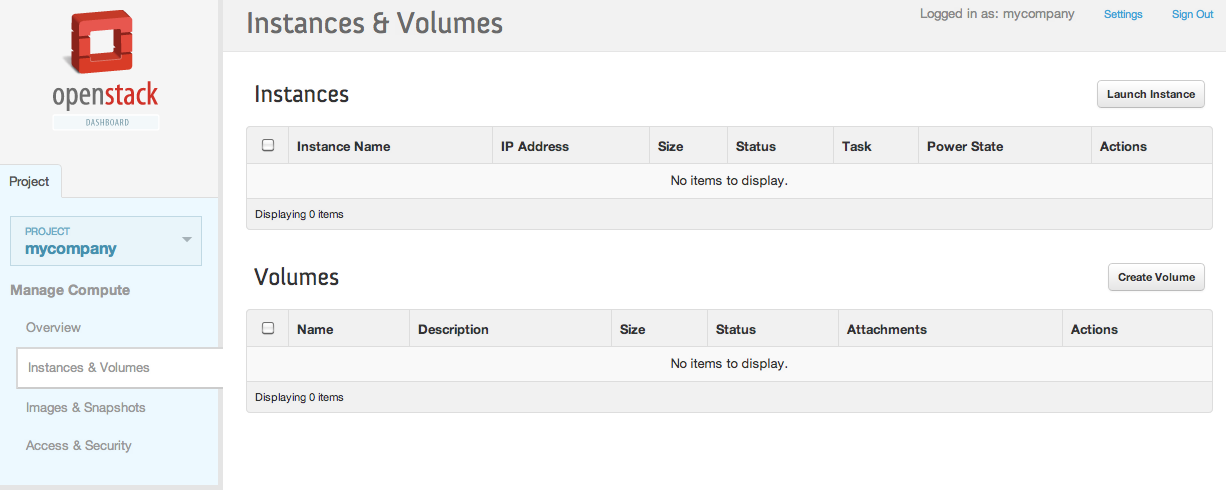


Figure 5. List of Instances and Volumes (User View)

Select the desired VM image for the new instance and click over “Launch”

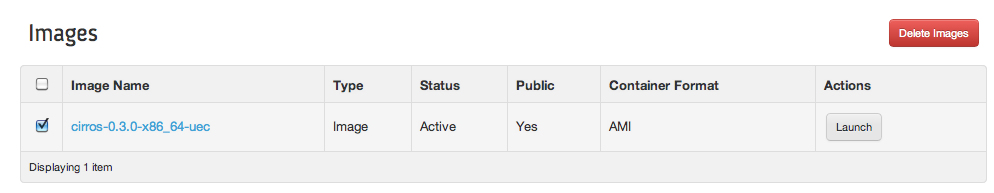


Figure 6. Images Available (User View)

Next, we need to assign a name to the instance and select the parameters such as flavor (size of the VM based on CPU, HD and Memory) and a keypair. Note that we have not yet created security groups yet, so we’ll only see one option (“default”) for security groups.

We can also assign also a brief description of the instance. If we want to create several instances with the same characteristics, we can also set the number of instances we wish to create.

Figure 7 shows an example in which we’ve created a single instance called “vm1” using the “m1.tiny” flavor. Available keypair files may be selected in this section. OpenStack will inject the signed RSA private key into the instance after completing the instantiation process (image creating, booting and network assignment).

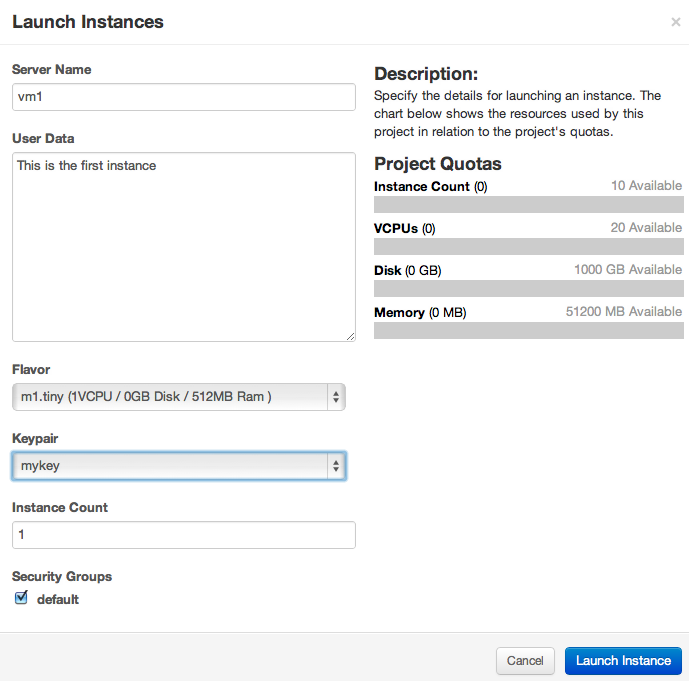


Figure 7. New instance required parameters

Once you’ve finished filling out the form, click the “Launch Instance” button to boot the instance. The instances section will show the status of the newly created instance:

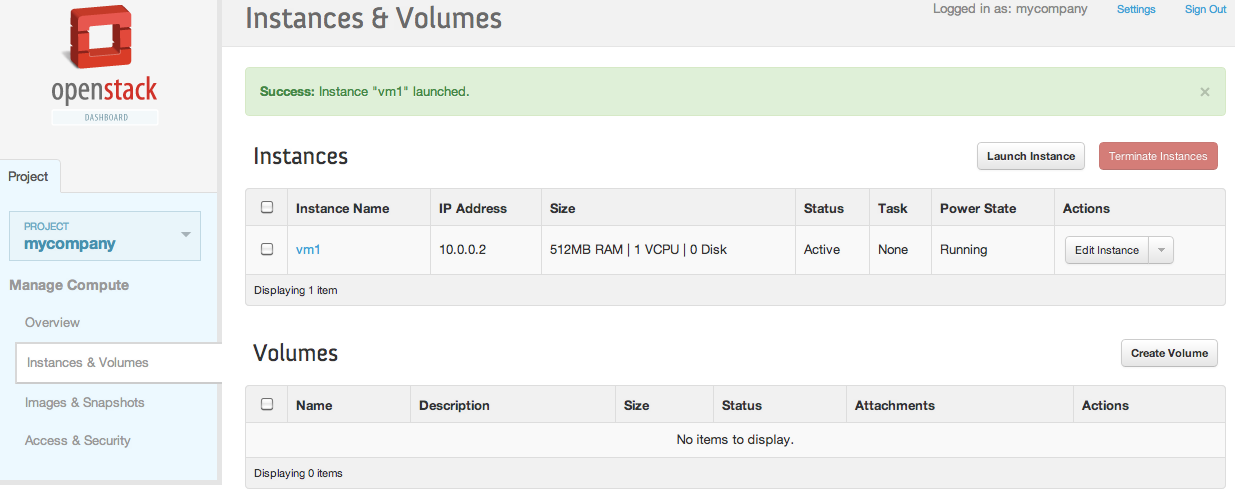


Figure 8. Status of the new instace

The Action section allows Project Admins to see the Console Log of the recently created instance, by simply selecting the “View Log” option.

In the same section, the Project Admin can launch the VNC Console view. This view allows the Project Administrator to interact with the instance as it boots up. Note that you cannot use VNC Console from a Chrome browser. You need both Flash installed and a Firefox browser

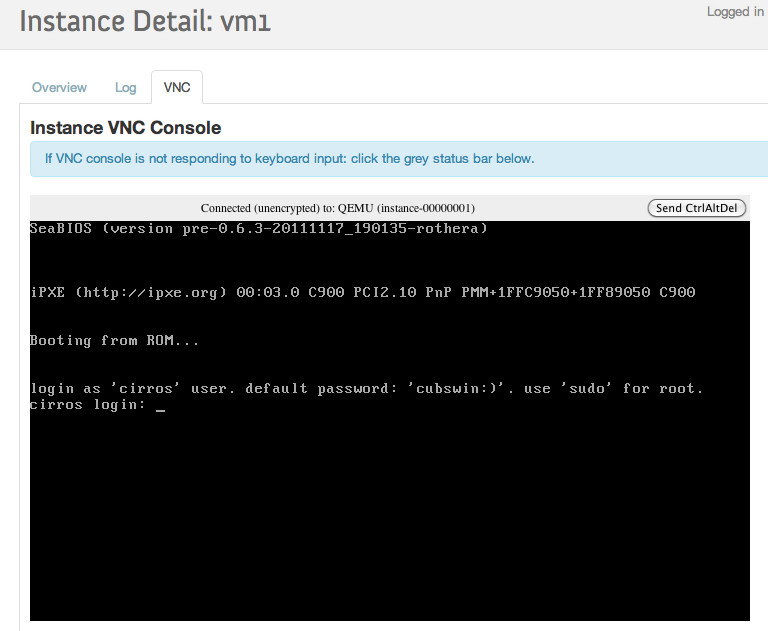


Figure 9. Console view per instance

## Accessing Instances by Terminal Console

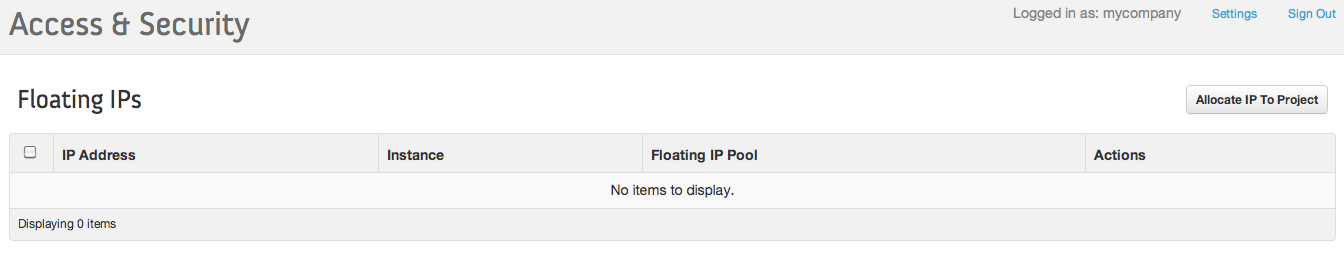
Another simple way to access the created instances is by using the terminal console. This is a two-steps process when no floting IP have been assigned to the respective instance: first, ssh to the cloud controller server or any available server in the same network from the user machine. Next, ssh to the actual VM based on the IP assigned and reported in the Instances & Volumes screen above presented. If a keypair was assigned during the instance creating process, it can be use during the ssh conection to avoid the exchange of credentials. This will be the command to use:

# ssh -i mykey.priv <instance\_IP\_address>

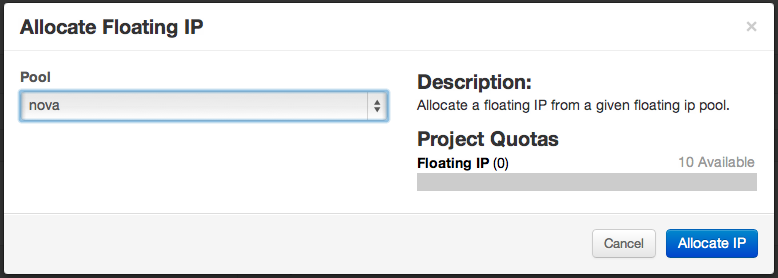
## Floating IP Management

OpenStack Cygnet release automatically assigns one private IP address to each one of the instances created by the users. This is based one the FlatDHCPNetwork pre-configured by the deployment framework [1]. Users may assign a public IP that is commonly known as “Floating IP” because is an IP address that is added to any running instance. It will let users to contact those instances from a public network without having to connect first to the private one.

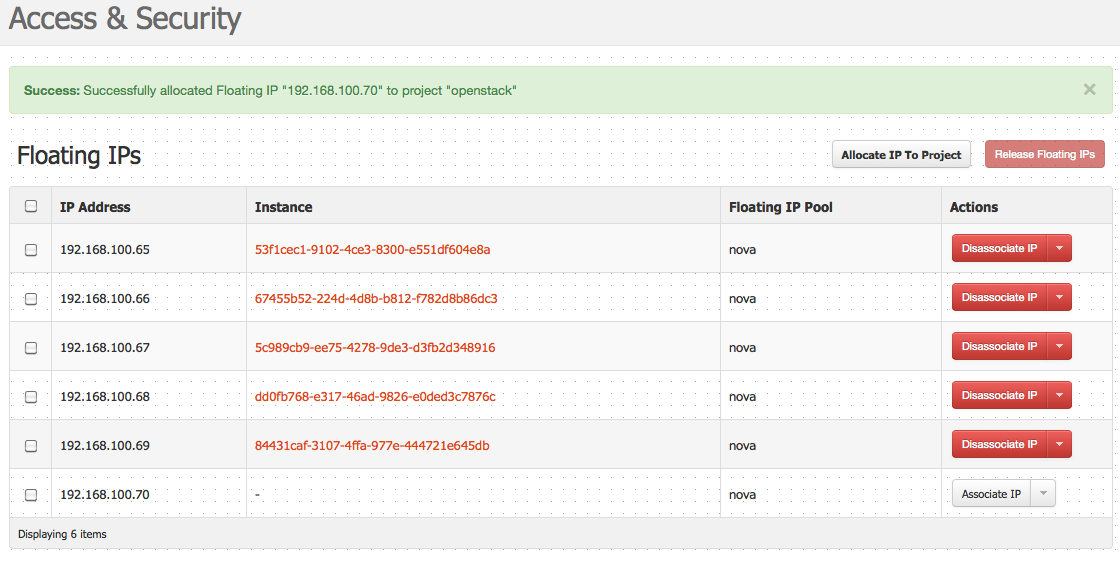
Assigning a floating IP is done from the Access & Security section of the Project Panel. The first step is to allocate an IP for the project (tenant). The following screenshoot shows the right bottom to select.



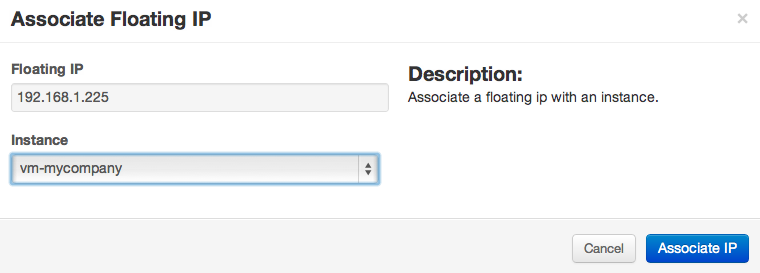
OpenStack administrator will have already IP pools available, user needs to select the one available and click over the “Allocate IP” bottom.



You should get a conformation message from the system about the allocation process. The next screen shows the above-mentioned message.



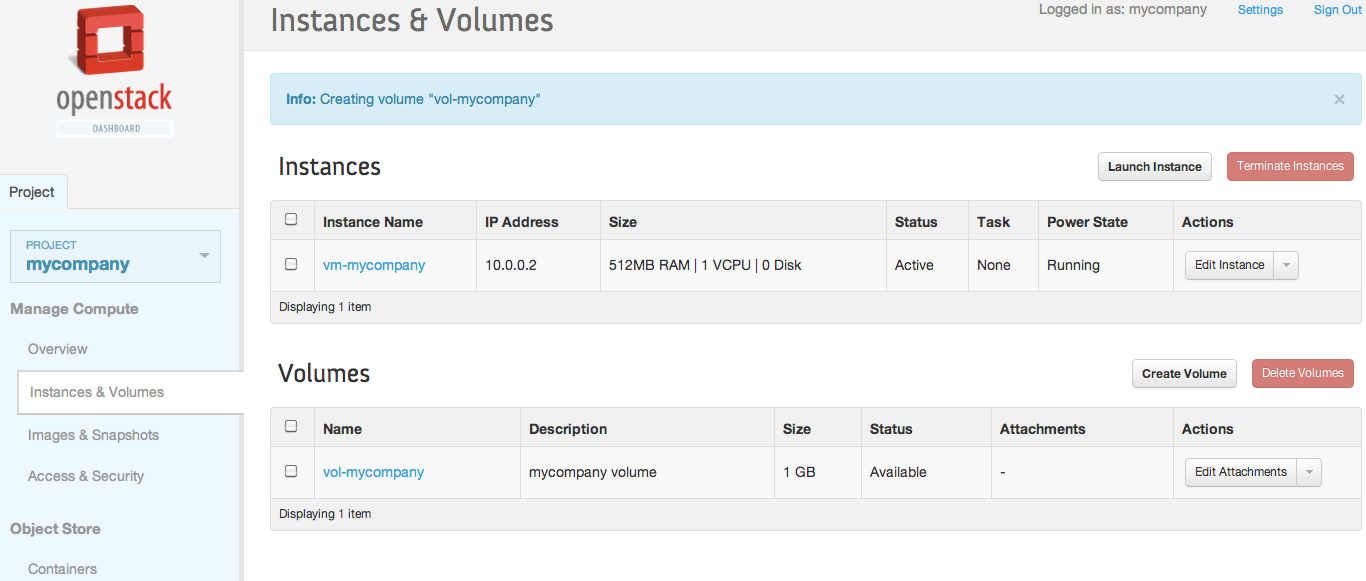
The last step is to associate the previously allocated IP to the instance that the user has selected. Figure XXX illustrates this process. A new confirmation message will be displayed by the system and the users can confirmed the assignment when the instance\_id is listed next to the Floating IP address.

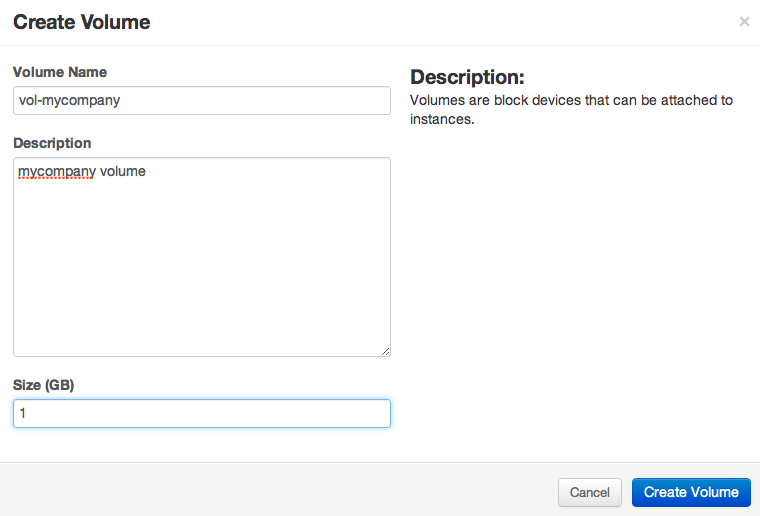


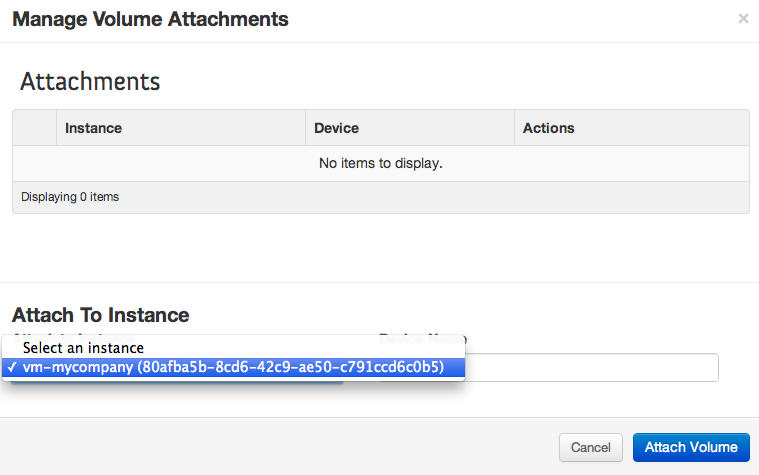
The process of releasing floating IP address is known as Disassociate IP. This is done be simple clicking over the respective buttom the Floating IPs sub-section of the Access & Security screen.

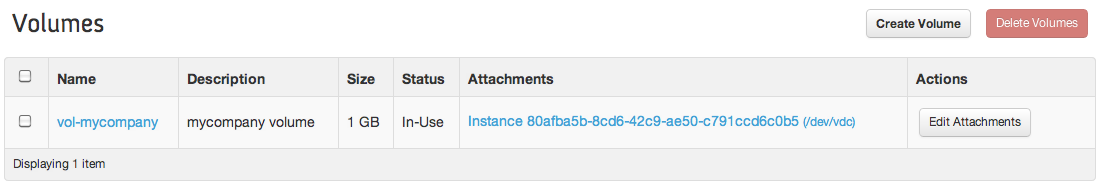
## Volumes

TODO (Edgar): Write this section



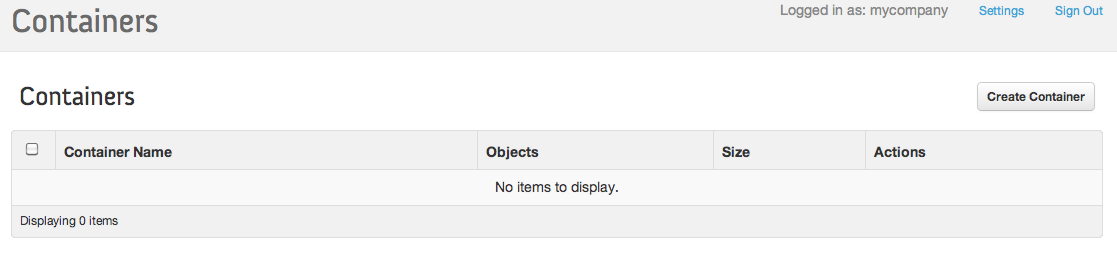


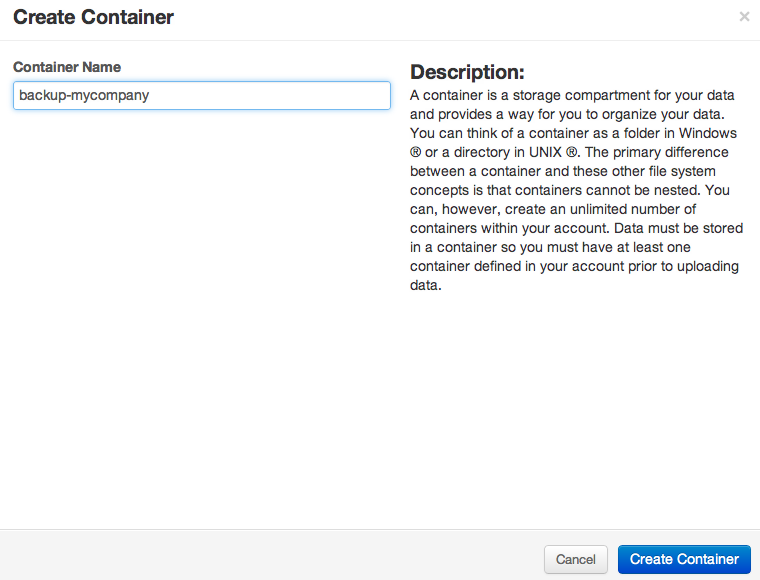




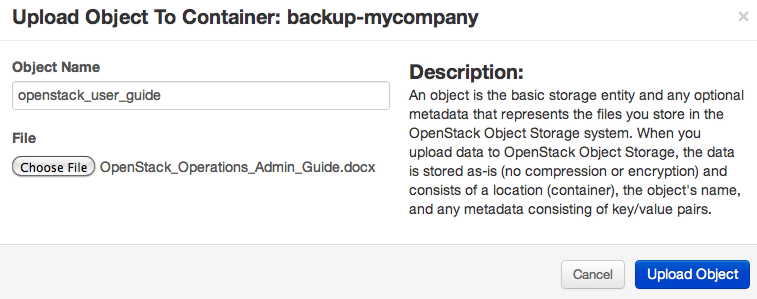
## Containers

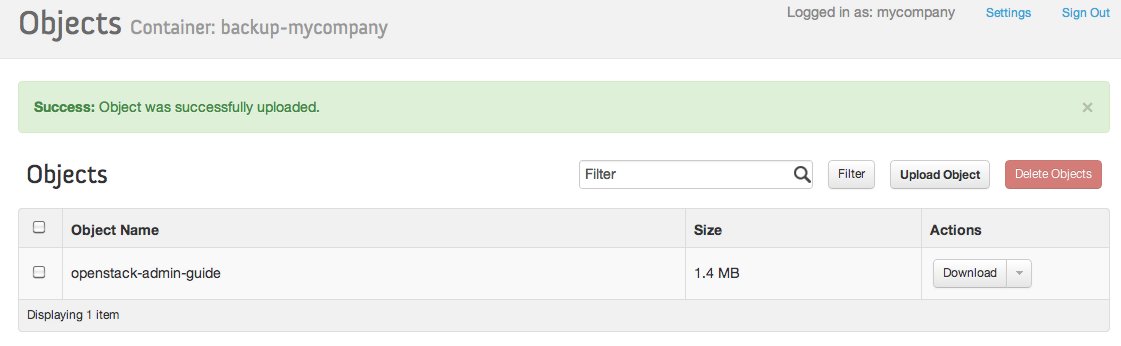
TODO (Edgar): Write this section











# EC2 API Comparison Matrix

This section attempts to enumerate how [OpenStack](http://wiki.openstack.org/OpenStack) compare in regards to EC2 API support. This information is based on OpenStack Essex release and [EC2 (API Version 2012-03-01)](http://aws.amazon.com/archives/Amazon-EC2/2886303838316017).

## General API Support

|  |  |
| --- | --- |
| **General Features** | [**OpenStack**](http://wiki.openstack.org/OpenStack) |
| EC2 Query API | Y |
| EC2 Soap API | N |
| OpenStack API / Rackspace API | Y |
| SSL Between Components | N |
| Horizontal Component Scalability | Y |
| Web-based UI | Y |
| Command line interface | Y |

## Amazon EC2 High Level Feature Support

|  |  |
| --- | --- |
| **EC2 feature** | [**OpenStack**](http://wiki.openstack.org/OpenStack) |
| Shared AMIs | Y |
| Parameterized launch (user-data) | Y |
| Instance metadata | Y |
| Public AMI's | Y |
| Launch/Terminate Instance | Y |
| Reboot Instance | Y |
| Start/Stop Persisted Instance | Y |
| Retrieve Console Output | Y |
| Paid AMI's | N |
| Multiple Instance Types | Y |
| Instance Launch Time | Y |
| Elastic IP's | Y |
| Availability Zones | Y |
| Region Support | Y |
| User selectable kernels | Y |
| Elastic Block Store | Y |
| Booting without a ramdisk | Y |
| Windows Support | Y |
| Reserved Instances | N |
| Auto Scaling | N |
| Elastic Load Balancing | N |
| [CloudWatch](http://wiki.openstack.org/CloudWatch) | N |
| Virtual Private Cloud (IPSec) | N |
| Shared Snapshots | N |
| AMI's backed by EBS | Y |
| Spot Instances | N |
| Sticky session in Elastic LB | N |
| Specify IP address for inst in VPC | N |
| Tags | N |
| Filters | N |
| Idempotent [RunInstance](http://wiki.openstack.org/RunInstance) Calls | N |
| Import keypair | Y |
| SSL termination | N |

## Amazon EC2 API Compatability

|  |  |
| --- | --- |
| **EC2 API method** | [**OpenStack**](http://wiki.openstack.org/OpenStack) |
| AllocateAddress | Y |
| AssociateAddress | Y |
| AttachVolume | Y |
| AuthorizeSecurityGroupIngress | Y |
| BundleInstance | N |
| CancelBundleTask | N |
| CancelSpotInstanceRequests | N |
| ConfirmProductInstance | N |
| CreateImage | N |
| CreateKeyPair | Y |
| CreatePlacementGroup | N |
| CreateSecurityGroup | Y |
| CreateSnapshot | Y |
| CreateSpotDatafeedSubscription | N |
| CreateTags | N |
| CreateVolume | Y |
| DeleteKeyPair | Y |
| DeletePlacementGroup | N |
| DeleteSecurityGroup | Y |
| DeleteSnapshot | Y |
| DeleteSpotDatafeedSubscription | N |
| DeleteTags | N |
| DeleteVolume | Y |
| DeregisterImage | Y |
| DescribeAddresses | Y |
| DescribeAvailabilityZones | Y |
| DescribeBundleTasks | N |
| DescribeImageAttribute | Y |
| DescribeImages | Y |
| DescribeInstanceAttribute | N |
| DescribeInstances | Y |
| DescribeKeyPairs | Y |
| DescribePlacementGroups | N |
| DescribeRegions | Y |
| DescribeReservedInstances | N |
| DescribeReservedInstancesOfferings | N |
| DescribeSecurityGroups | Y |
| DescribeSnapshotAttribute | N |
| DescribeSnapshots | Y |
| DescribeSpotDatafeedSubscription | N |
| DescribeSpotInstanceRequests | N |
| DescribeSpotPriceHistory | N |
| DescribeTags | N |
| DescribeVolumes | Y |
| DetachVolume | Y |
| DisassociateAddress | Y |
| GetConsoleOutput | Y |
| GetPasswordData | N |
| ImportKeyPair | Y |
| ModifyImageAttribute | Y |
| ModifyInstanceAttribute | N |
| ModifySnapshotAttribute | N |
| MonitorInstances | N |
| PurchaseReservedInstancesOffering | N |
| RebootInstances | Y |
| RegisterImage | Y |
| ReleaseAddress | Y |
| RequestSpotInstances | N |
| ResetImageAttribute | N |
| ResetInstanceAttribute | N |
| ResetSnapshotAttribute | N |
| RevokeSecurityGroupIngress | Y |
| RunInstances | Y |
| StartInstances | Y |
| StopInstances | Y |
| TerminateInstances | Y |
| UnmonitorInstances | N |

# FAQs

TBC…

# Support

Any issues or discrepancies above please mail: [eperdomo@cisco.com](mailto:eperdomo@cisco.com) (Edgar Magana) and [openstack-support@cisco.com](mailto:oOpensStack-support@cisco.com)

Related OpenStack Documentation

=============================================

OpenStack Essex Administration Guides

http://docs.openstack.org/

openstack Essex API Guides

http://docs.openstack.org/api/

OpenStack Essex Developer Documentation

[http://docs.openstack.org/developer/](http://docs.oOpensStack.org/developer/)

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mentioned in this document are the property of their respective owners.

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# Glossary

The following list describes acronyms and definitions for terms used throughout this document:

1. **HA**: High Availability
2. **FO**: Failover. A term used to indicate a failed active node is taken out of service and replaced automatically by another dedicated node that was previously in a standby mode of operation.
3. **UI**: User Interface

# References

[1] OpenStack Installation Guide

# Appendix A

**A.1 Bla bla bla …**

End of Document

1. Description from http://OpenStack.org/, 06/26/2012. [↑](#footnote-ref-1)
2. Adapted from [http://nova.OpenStack.org/nova.concepts.html](http://nova.openstack.org/nova.concepts.html), 06/26/2012. [↑](#footnote-ref-2)
3. Adapted from the OpenStack Compute Administration Manual, Essex (2012.1). http://docs.openstack.org/essex/openstack-compute/admin/content/index.html [↑](#footnote-ref-3)